

REMARKS

Reconsideration of the present application, as amended, is respectfully requested. Claims 8-13, and 18-42 of the present application are currently pending. Claims 8-13, 18, and 39-42 have been allowed. Claims 19, 22-28, 32, and 34-35 have been amended to better reflect the invention.

35 U.S.C. § 103 Rejections

The Examiner has rejected claims 19-21, 23-24, 26-27, and 29-31 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. 3,045,702 by Nakata (hereinafter “Nakata”), in view of U.S. Pat. 4,778,532 by McConnell et al. (hereinafter, “McConnell”). In light of the amendment, the Examiner’s rejections have become moot. Nonetheless, the following remarks regarding the Examiner’s rejections and the amended claims may be helpful to expedite prosecution.

Independent claim 19 has been amended to include the limitations that a **liquid** chemical is measured, **mixed** with DI water in a **pressurized** chamber, and applying the mixture to a **semiconductor wafer**. In contrast, Nakata discloses a gas analysis method and fails to disclose or suggest measuring a **liquid** chemical with a measuring tube, nor **mixing** the liquid chemical with a **measured** amount of **DI water** in a **pressurized** chamber, nor **applying** the mixture to a wafer, nor a **single wafer process**. Similarly, McConnell fails to disclose or suggest measuring a liquid chemical with a measuring tube, nor the use of a **pressurized** chamber. The Examiner asserts that McConnell discloses a semiconductor cleaning process which includes filling a chamber to a predetermined level, thus constituting a measured amount. However, McConnell uses a metering pump to generate the

desired measured amount used in their wafer process. McConnell fails to disclose or suggest at least the limitation that the volume of the tube **equals** the measured amount used in a single wafer process.

Applicant assert that Nakata and McConnell are not combinable because McConnell teaches away from the combination and because there is no motivation nor suggestion to combine these two specific references in such a way to suggest the claimed invention. McConnell, teaches away from the combination with Nakata because McConnell asserts that he has solved the metering problem with his invention using a metering pump within his system, which is not compatible with the Nakata's system which is based on a valve system having a measuring tube. There is no motivation to combine because McConnell considered the measuring problem solved and would not be motivated to look elsewhere, since the problem no longer existed.

Independent claim 26 has been amended to include the limitations that a **first liquid** chemical is measured, **mixed** with a second **liquid** chemical in a **pressurized** chamber, and applying the mixture to a **wafer**. The discussion above regarding claim 19 also apply to claim 26.

Independent claim 23 has been amended to include the limitation of a **hydrophobic** membrane, nor **applying** the mixture to a wafer, nor a single wafer process. In addition to the above arguments relating to claims 19 and 26, both Nakata and McConnell, nor any of the prior art of record discloses or suggests the use of a **hydrophobic** membrane.

In view of the above remarks, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicants' silence regarding any

dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim.

Applicant, accordingly, respectfully requests withdrawal of the rejection of claims 19-21, 23-24, 26-27, and 29-31 under 35 U.S.C. § 103(a) as being unpatentable Nakata in view of McConnell.

The Examiner has rejected claims 22, 25, and 28 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. 3,045,702 by Nakata (hereinafter "Nakata") in view of McConnell as applied to claims 19, 23, and 26 above, and further in view of U.S. Pat. 4,243,071 by Shackelford (hereinafter "Shackelford"). In light of the amendment, the Examiner's rejections have become moot. Nonetheless, the following remarks regarding the Examiner's rejections and the amended claims may be helpful to expedite prosecution.

Skackelford fails to remedy the deficiencies of Nakata and McConnell. Skackelford was introduced to allegedly disclose the element of interchanging the tube to change the volume of the reservoir. Skackelford relates to a liquid chromatographic process and fails to provide any disclosure, suggestion, or motivation to combine with a semiconductor cleaning process.

In view of the above remarks, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicants' silence regarding any dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 22, 25, and 28 under 35 U.S.C. § 103(a) as being unpatentable Nakata in

view of McConnell as applied to claims 19, 23, and 26 above, and further in view of Shackelford.

The Examiner has rejected claims 32-38 under 35 U.S.C. § 103(a) as being unpatentable by U.S. Pat. 3,291,347 by Blades (hereinafter "Blades"). In light of the amendment, the Examiner's rejections have become moot. Nonetheless, the following remarks regarding the Examiner's rejections and the amended claims may be helpful to expedite prosecution.

Applicant's invention relates to a method of mixing chemicals comprising: flowing a first liquid chemical into a first valve system having a first tube; flowing a second liquid chemical into a second valve system having a second tube; wherein the first and second tubes are external to the valves in the first and second valve systems; flowing a first and second flushing fluid into said first and second valve systems, respectively, to discharge only said measured amount of said first liquid chemical and only said measured amount of said second liquid chemical, wherein only said measured amount of first and second liquid chemicals are mixed together; and wherein, at least one of said first and second flushing fluids have an approximately known volume.

With regard to independent claim 32, the claim contains the limitation that the tubes used for measuring the first and second liquid chemicals are "**external** to the valves" in the first and second valve systems. Further, the claim requires the use of two separate valve systems, and in some embodiments 6-port valves, and in some embodiments two 3-port valves replacing a 6-port valve.

In contrast, the measuring tubes in Blades are **internal** to and an integral part of the valve. Further, as the Examiner has identified, Blades fails to disclose the limitation of using two separate valve systems, and instead discloses a single valve system with a single 6-port valve having two measuring tubes internal to that valve. These differences are significant because they greatly restrict the process flexibility required in semiconductor wafer processing. In Blades, the ability to change the volume of the tubes is much more difficult and prohibitively expensive because it would require physically changing the valve with a different valve having different sized tunnels. Each different valve would have to be machined with different diameter tunnels. Further, the volume of fluid, which could be stored in the valve's tunnels, would be limited by the size of the valve, requiring large valves for large volumes. Large valves, with custom machined tunnels, are much more expensive than a mere tube with a large diameter and/or long length.

In addition, the Examiner asserts as obvious the use of two valve systems instead of just one valve system, on the grounds that the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function, manner, and result, was held not to be patentably distinguishable. Applicants assert that an embodiment having two systems has no relevance to splitting a process step. The differences between a two systems embodiment and a one system embodiment are structural in nature, whereas the mere splitting of one process step into two process steps would not disturb the structure of the system. Applicants request that Examiner clearly identify which process step is allegedly being split.

Furthermore, the two valve systems embodiment is not identical or equivalent to a one valve system in terms of function, manner, or result. Although, they may be equivalent in many respects, there are some important distinctions, that render the embodiment non-obvious over Blades. The use of two independent valve systems permits each valve system to operate independently of the other valve system, which could be beneficial when flushing system lines at shut down or charging system lines with fresh chemicals at the proper concentrations at start up, prior to applying the mixture to the first wafer.

Applicant's invention relates to the synergetic effect of combining two valve systems with external measuring tubes to create an embodiment providing substantial semiconductor wafer processing latitude at greatly reduced costs over the prior art of record, while maintaining superior process quality and speed.

In view of the above remarks, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicants' silence regarding any dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 32-38 under 35 U.S.C. § 103(a) as being unpatentable over Blades.

Allowable Subject Matter

Applicant has noted, with appreciation, that the Examiner has allowed claims 8-13, 18, and 39-42.

Applicant respectfully submits that the present application is in condition for allowance. If the Examiner believes a telephone conference would expedite or

assist in the allowance of the present application, the Examiner is invited to call Michael A. Bernadicou at (408) 720-8300.

Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,
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